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Impact of Search Engine Characteristics on Equilibrium in Electronic Markets

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Primary Research Areas

Electronic commerce, economics of information systems, markets, search, web based commerce, utility theory, pricing strategies, search engine technology and information retrieval.

Research Motivation

The Internet has emerged as an effective forum for electronic commerce that integrates widely dispersed buyers and sellers and encourages them to transact by adopting both synchronous and asynchronous buying and selling activities. A major impact of such marketplaces is the resulting reduction in buyer search costs, as buyers can easily access, compare and evaluate product offerings from different sellers. Many researchers (e.g. Bakos, 1997, Malone, Benjamin and Yates 1991) have suggested that lower search costs will result in a move toward frictionless and competitive markets and lower prices, resulting in increased market efficiency, and smaller seller profits.

The role played by search engines assumes considerable significance in this context and the search capabilities of search engines becomes an important issue that can impact both buyer surplus and seller revenues. Technical research on search engine design has focused on the workings of search engines from a technical perspective and have analyzed their efficiency in terms of the ***precision*** and ***recall*** features of search engines. This research models the impact of precision, recall and ranking abilities of search engines on electronic markets and pricing strategies of sellers.

Research Questions Addressed

1. What is the impact of search engine features such as Precision and recall on the price in a market equilibrium and the resulting behavior of buyers and sellers at equilibrium?
2. What will be the behavior of buyers and sellers when the search engine provides different levels of granularity of search (different levels of precision, recall and ranking accuracy) capabilities for price and product information?
3. What is the impact of a search engine's ability to rank products retrieved, on seller territories and buyer surplus?
4. What is the price that buyers would be willing to pay (in terms of the equilibrium price in the market) for a search engine that will allow them to get both product and price information at the same level of accuracy (precision as well as recall)?

Research Methodology

I will develop a series of mathematical models which draw primarily from utility theory, theory of search and from allied micro-economic principles. These models provide a framework for evaluating, buyer search behavior and the efficiency of electronic markets, the benefits of product differentiation, the increase in buyer surplus through reduced search costs. The combination of uncertainty and multidimensional product space results in highly complex mathematical functions, which will be solved analytically and wherever necessary the technique of numerical simulations will be adopted to provide solutions to different closed form equations.

Validation of these results will be done by testing them against empirical data collected from electronic markets currently in operation through automated mechanisms and the application of standard statistical techniques.

Contribution of this Research

My results will illustrate the importance of technological factors associated with search engines in bringing about different market outcomes and influencing buyer and seller strategies in electronic markets.

This research will also help determine when it is socially optimal for a third party to provide search engine facilities to buyers and sellers.

Finally, the results derived from this model, will help determine the economic value of technological features such as Precision, Recall and Ranking abilities that enhance the search effectiveness of search engines.

References

A detailed list of references will be made available by the author on request (rarunkun@stern.nyu.edu).